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Editor's Note

Welcome to the *Journal of Conflict Management and Sustainable Development,* Volume 11, No.5. The Journal is an interdisciplinary publication that focuses on key and emerging themes in Conflict Management, Sustainable Development and other related fields of knowledge.

Sustainable Development has been embraced at both the global and national levels as the blue print for socio-economic development and governance. The Journal interrogates and offers solutions to some of the current concerns in the Sustainable Development Agenda. It also explores the role of Conflict Management in the attainment of Sustainable Development.

The Journal has witnessed significant growth since its launch and is now a widely cited and authoritative publication in the fields of Conflict Management and Sustainable Development. The Editorial Team welcomes feedback and suggestions from our readers across the globe to enable us to continue improving the Journal.

The Journal is peer reviewed and refereed in order to adhere to the highest quality of academic standards and credibility of information. Papers submitted to the Journal are taken through a rigorous review by our team of internal and external reviewers.

This volume contains papers on various themes including: *Protecting Our Endangered Species for Sustainability; Changing The Narrative on the Right to a Clean and Healthy Environment: Analysing Ecocentrism as a Possible Method of Environmental Governance in Kenya; Integrating Environmental Social & Governance (ESG) Principles into Corporate Governance in Kenya: Trends, Challenges, and Best Practices; Problematic Overlaps and Duplication of Mandates of State and Governmental Agencies in Kenya: Proposals for Legal and Institutional Reform; Lesson Study: Towards an Improved Instruction in Stem Education in Junior Secondary Schools In Kenya; Management of Industrial Waste water in Kenya: Case study of Mavoko; Does the Law Work? A Case of Kenyan Prison Congestion and the Witchcraft Act; Fostering Sustainable Lifestyles for Posterity; Legislating to Protect and Compensate Whistleblowers in Kenya: An Appraisal of*

the Proposed Whistleblower Protection Bill, 2023; The Phenomena of Resource Curse and How to Navigate around it; Primary Teacher Education and Kenya's Vision 2030. The Lacuna in the Transformation Agenda; Mitigating the Environmental Impact of Oil: Strategies for Sustainable Development; and *The Implications of Implementing Kenya's Electronic Travel Authorisation (eTA) System: A Comparative Appraisal*. The Journal also contains a book review of *Towards Human Rights and Prosperity for All* and a review of *Journal of Appropriate Dispute Resolution (ADR) & Sustainability Volume 2 Issue 3.*

We welcome feedback, comments and critique from our readers to enable us to continue improving the Journal.

I wish to thank all those who have made this publication possible including reviewers, editors and contributors.

The Editorial Team also welcomes the submission of articles to be considered for publication in subsequent issues of the Journal. Submissions can be channeled to *admin@kmco.co.ke* and copied to editor@journalofcmsd.net.
Our readers can access the Journal online at https://journalofcmsd.net.

Hon. Prof. Kariuki Muigua Ph.D, FCIArb, Ch.Arb, OGW.
Professor of Environmental Law and Conflict Management
Editor, Nairobi,
November, 2024.

Management of Industrial Wastewater in Kenya: Case study of Mavoko

By: ***Catherine Sanitta Muttuku****

Abstract

The right to a clean and healthy environment is fundamental to a country's sustainable economic development and underpins various rights and freedoms. Effective industrial effluent management is crucial for protecting climate security and maintaining stable ecosystems. This requires a policy framework that addresses contemporary challenges. Fortunately, Kenya has established a comprehensive legal and institutional framework for managing industrial effluent. However, its effectiveness is undermined by several factors, including the dispersion of regulations across multiple legal instruments, institutional failures, corruption, insufficient awareness of technological advancements in effluent management, and inadequate implementation of industrial symbiosis practices.

This article examines Kenya's policy framework for industrial effluent management and suggests potential improvements. These include the creation of a unified policy instrument to consolidate existing regulations, enhancement of industrial symbiosis, better institutional coordination, and increased public awareness. Addressing these areas will strengthen the framework and contribute to a healthier environment and more sustainable economic development.

Key Phrases: Public participation; Rule of Law; Industrial Effluent; Environmental Impact Assessment, Sustainable development.

Introduction

Kenya stands out among Sub-Saharan African countries with its rapidly growing economy, driven by substantial investments in revitalized industries crucial for alleviating poverty.[1] However, it is imperative to ensure that this economic

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[1]Lucas Schmidt, *True progress for industrialization in Kenya,* (2020) para1< https://borgenproject.orgigf/industrialization-in-kenya/ >accessed 15th July 2024.

development prioritizes sustainable environmental practices. This is because a clean and healthy environment is crucial for the enjoyment of fundamental rights and freedoms, including access to clean and safe drinking water, a sustainable standard of health, adequate housing, sufficient food, and reasonable sanitation standards.[2] The Constitution makes it a duty for the state and individuals to promote practices that protect the natural environment.[3]

This duty extends to the protection of both terrestrial and aquatic ecosystems, through various activities, including the management of industrial effluents.[4] Fortunately, Kenya has legislations with explicit provisions on discharge of effluent including those encapsulated in the Water Act, Environmental Management and Coordination Act among other legal instruments discussed under part three of this article, which are aimed at ensuring proper management of industrial wastewater.

Despite this, concerns have emerged regarding the sustainability of these instruments. These concerns stem from the expectation that effective laws should address both current and future challenges comprehensively and practically. In essence, laws should be adaptable to contemporary issues and transformations.[5] This paper asserts that existing laws adequately govern the management of industrial effluents and that the main challenge lies in their implementation due to the existence of multiple obstacles.

The perceived weakness in the implementation of the existing regulatory framework is evidenced by the fact that some stakeholders still circumvent the law and discharge untreated effluent containing heavy metals and other toxic

[2] The Constitution of Kenya 2010, Article 43.
[3] Ibid, Article 69.
[4] Ibid, Article 69 (1)(g).
[5] The United Nations Environment Program (UNEP), Environmental Rule of Law. < https://www.unep.org/explore-topics/environmental-rights-and-governance/what-we-do/promoting-environmental-rule-law-0> accessed 22nd October 2024.

substances directly into water resources such as the River Athi.[6] Similarly, the significant water pollution observed in urban areas, attributed to inadequate wastewater management facilities, underscores the inadequate compliance with the legal framework by stakeholders.[7] Some stakeholders have not implemented appropriate treatment measures, while others have failed to maintain their treatment facilities as mandated, thereby struggling to manage the increased volumes resulting from rapid industrial expansion.[8]

The increased stream and dam water pollution degrade water quality, which consequently jeopardizes both human access to clean and safe drinking water as well as the aquatic ecosystem.[9] Additionally, this increases the likelihood of waterborne diseases and risks to public health, thus impacting livelihoods significantly.[10] Moreover, it endangers natural biodiversity.[11]

This article critically examines the sustainability of the current regulatory

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[6] Wahome Catherine, Muli Peter,….Momanyi Evans & Hassan Feisal, E*valuation of Effluent Discharge from Steel Manufacturing Industries on the Proliferating Environmental Degradation in Nairobi Metropolitan in the Republic of Kenya* (2021) vol.9(9) Journal of Geoscience and Environment Protection. P198< https://www.scirp.org/journal/paperinformation?paperid=112330> accessed 22nd October 2024.

[7] Juliana Mutua, Angwata Evans & Stephen Anyango, *Effectiveness of sanitation policy instruments in Mavoko Municipality of Machakos County, Kenya* (2017) vol.3(1) Cogent Environmental Science. < https://www.researchgate.net/publication/317628690_Effectiveness_of_sanitation_policy_instruments_in_Mavoko_Municipality_of_Machakos_County_Kenya> accessed 22nd October 2024.

[8] Ibid.

[9] Gete Zeleke & Endaweke Assegide, *Impacts of Surface Water Quality in the Awash River Basin, Ethiopia: A Systematic Review* (2022) vol.3, Water and Human Systems. < https://www.frontiersin.org/journals/water/articles/10.3389/frwa.2021.790900/full> accessed 22nd October 2024.

[10]KEWASNET, *Lets talk wastewater,*<https://kewasnet.co.ke/lets-talk-wastewater/#:~:text=A%20number%20of%20wastewater%20treatment,to%20expand%20the%20wastewater%20infrastructure.>accessed 20th July 2024.

[11]KEWASNET(n3).

framework by exploring wastewater management systems in Kenya, focusing specifically on Mavoko municipality in Machakos County as a key example. The paper progresses through six main sections. Section two analyzes the Mavoko case study, assessing the status and impacts of existing industrial wastewater management systems. Section three explores the regulatory framework governing industrial wastewater management in Kenya. Section four addresses the challenges associated with managing industrial effluents in the country. Section five proposes recommendations, while section six concludes.

The Mavoko

Mavoko, also known as Athi River, is a town located 25 km southeast of Nairobi, the capital city of Kenya, and serves as the administrative center for Mavoko Sub-County.[12] The town is renowned for its rapid industrial development,[13] hosting over 50 industries including steel mills, cement plants, and chemical factories.[14] According to scholars like Caleb Mireri, this rapid growth is attributed to several factors: strategic location, affordable land, abundant labour supply, robust transport and communication infrastructure, availability of raw materials, and strong market connections.[15]

There is no doubt that these industries produce large volumes of effluent, which

[12]Nyasani Mbaka and Benson Osumba, *Muunganowa Wanavijiji: Focus on Athi River,* (2012) < https://www.muungano.net/browseblogs/2012/04/24/focus-on-athi-river>accessed 20th July 2024

[13]Un-Habitat, *Mavoko Urban Sector Profile,* (2006) p.4< https://staging.unhabitat.org/pmss/getElectronicVersion.asp?nr=2789&alt=1>accessed 20th July 2024.

[14]Mavoko municipality, <https://machakosgovernment.co.ke/mavoko-municipality/>accessed 21st July 2024.

[15]Caleb M.C Mireri , *Industrialization of Athi River Town,* (1992)p V-VI< http://erepository.uonbi.ac.ke/bitstream/handle/11295/65953/Mireri_Industrialization%20of%20Athi%20river%20town.pdf>accessed 21st July 2024.

if not well discharged can lead to serious degradation of environment.[16] To prevent this, most of the industries in Mavoko often treat the effluent before discharging it into sewer systems. Others rely on recycling, which involves the utilization of treated wastewater for use in irrigation schemes and farms as well as for other industrial activities.[17] This revamps water availability by limiting the pressure on potable water.[18] Moreover, recycling of wastewater not only cuts-down the demand for water supply in industries for the various processes, but also reduces the potential impact of wastewater on the environment water.[19]

However, it is noted from previous reports that the treatment mechanisms, including the sewage treatment plant at Athi River's Export Processing Zone (EPZ), are ineffective because they cannot treat chemical waste like phosphorus and heavy metals like lead, mercury and selenium especially in the rainy season.[20] Furthermore, the industrial effluent treatment mechanisms are also relied upon by residential and commercial projects, which congest it and consequently making it to be less effective.[21] In the same vein, this has caused

[16]Hamza Kyeyune, *Ugandan River dying from pollution* (National Environment Management Authority, 2022)< https://www.aa.com.tr/en/africa/ugandan-river-dying-from-pollution/2533588>accessed 21st July 2024

[17]Environmental Engineering, < https://theconstructor.org/environmental-engg/recycling-of-wastewater/7001/>accessed 22nd July 2024.

[18] Mutua Juliana, Angwata Evans & Stephen Anyango, *Effectiveness of sanitation policy instruments in Mavoko Municipality of Machakos County, Kenya* (2017) vol.3(1) Cogent Environmental Science. P.22-23 < https://www.researchgate.net/publication/317628690_Effectiveness_of_sanitation_policy_instruments_in_Mavoko_Municipality_of_Machakos_County_Kenya> Accessed 22nd July 2024.

[19]Micronics Engineered Group (2022)< https://leadiq.com/c/micronics-engineered-filtration-group/5a1d87bd240000240061ac31>accessed 22nd July 2024.

[20] Nadir, S., Tole, M., Dharani, N., & Wafula, G. *Effectiveness of a Wastewater Treatment Plant located at EPZ in reducing Pollutants Discharged into River Athi, Kenya*. (2020)p7,< https://www.semanticscholar.org/paper/5ff6cca23d05acb3a24d6f227c1a754b2317b7f1 >accessed 23rd July 2024.

[21] Ibid

some industries to discharge raw effluent into River Athi.[22]Aside from the system congestion, previous studies indicate that the treatment plant at the EPZ is not effectively reducing pollutants, particularly nitrates, phosphates, and heavy metals such as lead and mercury.[23]

As a result, water quality degradation has increased. For example, in 2023, River Athi was reported as one of the most polluted water resources in Kenya, posing potential health risks to nearby residents due to chemicals discharged through industrial effluents, which can be transmitted through the food chain.[24] Furthermore, raw effluents often contain high rates of Chemical Oxygen Demand (COD) which escalates the osmotic potential of water and adjacent soil, hindering the survival of aquatic organisms.[25] Moreover, leakage or over flow of untreated wastewater into rivers can cause microbial contamination, which expose farmers, consumers and other people who contact water from River Athi, to the risk of getting gastrointestinal illness, cancer, skin irritation, ear, eye and nose infections and respiratory illness.[26]

Therefore, it is imperative to urgently implement changes in Mavoko to address the situation. Key to this effort is ensuring that stakeholders and industrial owners strictly adhere to the established legal framework, including the policies discussed below.

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[22] Available at <https://epzakenya.com/water-sewerage/> accessed 23rd July 2024.
[23] Nadir, S., Tole, M., Dharani, N., & Wafula, G. *Effectiveness of a Wastewater Treatment Plant located at EPZ in reducing Pollutants Discharged into River Athi, Kenya*. (2020)p7,< https://www.semanticscholar.org/paper/5ff6cca23d05acb3a24d6f227c1a754b2317b7f1 >accessed 23rd July 2024.
[24] Marry Wangari, Athi River, *Thwake Dam most polluted water bodies, MPs told* (Nation, 2023)< https://nation.africa/kenya/news/athi-river-thwake-dam-most-polluted-water-bodies-mps-told-4346462>accessed 25th July 2024.
[25] 'Strategic Environmental Assessment Study in the Master Plan for Development of the Kinanie Leather Industrial Park' (November 2015) p.118
[26] John Omung'ala Aywa, '*Suitability of Athi River water for irrigation within Athi river town and its environs*' (2017)7

The Regulatory Framework for Industrial Wastewater Management in Kenya
Legal and Institutional governance

As highlighted in previous sections of this paper, wastewater management is a pressing issue given that water is essential for the survival of life. Bearing this in mind, Kenya put in place comprehensive framework for the protection of the environment through several ways including proper discharge of industrial effluent. The framework includes both international and domestic legal instruments including the Stockholm Declaration of 1972, Kyoto Protocol, the Constitution, Environmental Management and Coordination Act, the Water Act and the Sustainable management Act of 2022.[27]

The Constitution espouses the need to protect the environment as the foundational basis for the protection of fundamental rights and freedoms including the right to a clean and healthy environment,[28] right to clean and safe drinking water in adequate quantities, among others. The Constitution, further, calls for the involvement of the citizens in environment safety actions through public participation and goes on to provide for there to be public participation on environmental issues.[29] Worth noting is that the right to a clean and healthy environment,[30] is directly tied to the State obligations with regard to the environment.[31] This was stated in *Adrian Kamotho Njenga v Council of Governors & 3 others,*[32] where the court averred that the right under Article 42 to have the environment protected is guaranteed through the measures provided under Article 69 with the right extending to the obligations encapsulated under Article 70 of the Constitution.[33] Where a person alleges that his or her right under Article 42 is being or is likely to be denied or violated, infringed or threatened; they have

[27] Muigua K., *Nurturing our Environment for Sustainable Development, Glenwood Publishers*, 2016. pg 5: See also; Stockholm Declaration 1872
[28] Constitution of Kenya 2010, Article 42
[29] Constitution of Kenya 2010, Article 10 2(a)
[30] Article 42
[31] Article 69
[32] [2020] eKLR
[33] As above Para. 18

a right to seek redress under Article 70 and as held in *KM & 9 others v Attorney General & 7 others*.[34] The Constitution further establishes the Environment and Land Court,[35] with the jurisdiction to adjudicate on matters that relate to the environment and land matters.[36]

Pursuant to Article 72 of the Constitution, there are several legislations regulating the protection of the environment. For instance, the **Environmental Management and Coordination Act of 1999** establishes an effective regulatory and administrative approach to environmental management.[37] It establishes several institutions to deal with environmental matters. Among the notable institutions is the National Environmental Management Authority (NEMA), which is established under Section 7 of EMCA to supervise and coordinate all matters relating to the environment.[38] This includes overseeing the undertaking of the Environmental Impact Assessments (EIA) and issuing of licenses for projects as discussed in *Kibos Distillers & 4 others v Benson Ambuti Adega & 3 others*.[39]

The object of assessments and issuance of licenses stems from Part VI of the EMCA which gives provision for the need of an EIA to be conducted and a license to be issued before the project commences, lack of which a project can be invalidated. In *Cortec Mining Kenya Ltd v Cabinet Secretary Ministry of Mining & 9 others*,[40] the trial court emphasized on the need for the EIA licensing to be issued for projects that are likely to affect the environment.[41] The process of conducting EIA should consider the need for adequate public participation pursuant to Article 10 of the Constitution. Public involvement is crucial to this process, failure to which might subject the EIA license to challenge before a court of law. This

[34] [2020]eKLR para 134
[35] Constitution of Kenya 2010, Article 162(2)
[36] Environment and Land Court Act No. 26 of 2015; Part III
[37] EMCA 1999. Preamble
[38] EMCA 1999, Section 9(1)
[39] Civil Appeal No. 153 of 2019
[40] Civil Appeal No. 105 of 2015
[41] As above Para 14(II)

was enforced in the case of *Abdallah, Chairman, Donholm phase 5 Residents' Association v. Director General NEMA & another*.[42]

EIA licensing is attributed to NEMA which is mandated to conduct routine Environmental Audits and monitoring on all activities that pose harm to the environment.[43] In addition to the EIA requirements, the Act also provides for the need to have effluent discharge licenses (EDLs) which primarily deal with the regulation of the discharge of effluents into the environment including into water resources.[44]

There is also the establishment of the County Environmental Complaints Committees mandated to manage the environment at the county levels including to develop county environmental plans.[45]

EMCA also establishes the National Environment Tribunal (NET) and the National Environmental Complains Committee (NECC) to handle environment related disputes. NECC deals with investigations on allegations or complaints against the Authority or a person with regards to environmental conditions.[46] Meanwhile NET primarily deals with grievances regarding the issuance of licenses by NEMA.[47]

The other important instrument is the **Water Act No 43 of 2016** which regulates the development of water resources.[48] The Act primarily provides for further enforcement of the right to clean and safe drinking water,[49] as envisioned under

[42]Tribunal appeal no NET/38/2009 para 31&32.
[43] EMCA 1999. Part VII
[44] EMCA 1999. Section 75
[45] EMCA 1999. Section 30
[46] As above Section 31
[47] As above Section 125
[48] Water Act No 43 of 2016; Preamble
[49] As above Section 63, See also; Article 43(1)(d)

the Constitution.[50] This right is intertwined with the right to a clean and healthy environment under the Constitution, therefore both should be enforced in conformity with the Constitution as held in *Isaac Kipyego Cherop v State Ministry of Water & 142 others*.[51]

This Act establishes the Water Regulatory Authority (WRA) under Section 11, it further, insists on the EDL issued by NEMA for effluents being discharged into water resources. Under this Act it is also an operational condition for there to be an EIA license issued as reiterated in *Republic v National Environmental Management Authority(NEMA) & 2 Others; Ex Parte Misty Mountain Lodge Ltd & another*.[52] In addition to the WRA, the Act establishes the Water Tribunal,[53] with the jurisdiction to hear and determine disputes concerning water resources and appeals on decisions by the Authority or the concerned Cabinet Secretary.[54]

There is also the **Sustainable Waste Management Act No. 31 of 2022** which was enacted to guarantee and support the legislation of the State in the management of waste. The Act specifically seeks to ensure the waste management system is aligned towards enforcement of Article 42 on the right to a clean and healthy environment.[55] The principal body that governs the implementation of the Act is NEMA as established under EMCA. The Act provides for among others, the segregation of wastes into hazardous and non-hazardous,[56] and for the former to be handled in a manner prescribed under EMCA.[57] For effective waste management, the Act requires corporate entities to create three-year waste management strategies and to provide NEMA with detailed yearly accounts on

[50] Constitution of Kenya 2010, Article 42
[51] (2017) eKLR
[52] (Judicial Review Miscellaneous 6 of 2019) [2020] eKLR
[53] Water Act No. 43 of 2016, Section 119
[54] As above Section 121
[55] Sustainable Waste Management Act No. 31 of 2022, Section 3
[56] As above, Section 12(1) & (2)
[57] EMCA 1999, Section 87

the garbage produced and the waste management strategies employed.[58] This requirement reflects the requirement for regular environmental audits under EMCA.[59]

Offences and Penalties

To enhance the protection of the environment, the legal framework creates offences relating to environmental pollution. For instance, EMCA makes it an offence for a person to pollute the environment contrary to the provisions of the Act, this attracts a fine of not less than two million Kenyan shillings but not more than five million Kenyan shillings.[60] This can also culminate to the polluter being directed to pay the cost for cleaning up the polluted environment and to restore the environment.[61] A good example is the *Owino Uhuru Case*[62] where the court found against the defendant for releasing carbon monoxide and sulphur dioxide into the environment thereby causing pollution as under Section 142 of EMCA.

The Water Act on the other hand makes it an offence for a person to obstruct or pollute water resources without authorization,[63] in this instance the effluent discharge license. While Section 143 of the Act does not prescribe the specific penalties for the offence, the Act goes on to prescribe remedies for contravention of the provisions of the Act under Section 144. It coincides with the provisions of EMCA by prescribing the cleaning up of the pollutant from the environment and the removal of any works or machinery which have been employed in the contravention of the Act.[64] Conversely, the Sustainable Waste Management Act makes it an offence for anyone who fails to observe the waste management practices under the Act and those found with the offence are liable to not more

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[58] Sustainable Waste Management Act No. 31 of 2022, Section 19(1)
[59] EMCA 1999, Sections 68 & 69
[60] EMCA 1999, Section 142(1)
[61] EMCA 1999, Section 142(2)
[62] KM & 9 others v. Attorney General & 7 others
< *http://kenyalaw.org/caselaw/cases/view/265958/#:~:text=relief%20or%20compensation.-,Brief%20facts%20The%201%20st%20to%209%20th%20respondents%20on,suit%20property%2C%20which%20was%20approximately*> accessed 22nd October 2024.
[63] Water Act No. 43 of 2016, Section 143
[64] As above Section 144

than twenty thousand shillings or a prison term of not more than six months or both as the court may deem fit.[65]

Findings

The effectiveness of wastewater management in Mavoko and across Kenya is impeded by several challenges, including complexity of the regulatory framework, overlapping responsibilities, institutional failures, inadequate town planning, lenient penalties, and the use of outdated wastewater management practices. These challenges are discussed below:

Complexities in the regulatory framework

Industrial effluent management regulations are in multiple legal instruments which makes the regulatory framework to be more complex for lay persons to integrate some of the key regulatory requirements. This makes it difficult for some stakeholders to understand and implement the existing legal framework.[66] For example, EMCA and Water Act which govern effluent discharge under sections 74 to 77 and sections 36 and 108 respectively. Another instance is the establishment of NEMA under EMCA,[67] with its functions under sections 7 and 9 respectively, with other obligations established under sections 26 and 27 of the Sustainable Waste Management Act.[68] Similarly, the Water Act, initiates WRA and WASREB which have overlapping mandate with respect to water management which includes factors such as the quality as affected by effluent.[69]

Poor Institutional Coordination

This results from the duplicity of roles between institutions, such as NEMA and

[65] Sustainable Waste Management Act No. 31 of 2022, Section 20(2)

[66] Akinyi Florence Ogutu, *Assessment of the Effectiveness of the Policy Framework in Solid Waste Management in Nairobi City County* (University of Nairobi, 2019) pp.73-74. < https://www.scirp.org/(S(ny23rubfvg45z345vbrepxrl))/reference/referencespapers?referenceid=3324768> accessed 11th August 2024.

[67] EMCA, 1999

[68](Part Vii) No. 31 of 2022

[69] Water Act Act no.43. Sections 11 and 70 respectively.

WRA, because of similar functions between them. An example is the licensing of projects that are likely to discharge effluents to water resources, which is an obligation for NEMA under EMCA.[70] The same was brought out in *Jammal Ahmed Ali vs NEMA*,[71] and an obligation for WRA under the Water Act.[72] This breeds confusion between the two authorities which interferes with their smooth functioning.

Institutional failure

Institutional failures significantly undermine the enforcement of the law. Research conducted in East African cities has revealed that existing waste management laws are not being effectively implemented.[73] This is often caused by a lack of collaboration amongst institutions, especially those that operate within the framework of international law and at all levels of government.[74]

The perceived institutional failures are substantiated by claims and cases on which NEMA procured EIA licenses without considering the imperative of meaningful public participation.[75] The EIA, as held in *Kwanza's Estate case,*[76] is an important tool for informing the probable effects of a project on the surroundings.

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[70] Of 1999, section 75

[71] Jamal Ahmed Ali & 5 others vs NEMA & Another, Tribunal Appeal no.NET 196 of 2016; where the court held that NEMA should ensure that the EIA is undertaken and the procedure is correctly followed before issuing the EIA License including public involvement.

[72]No.43 of 2016, section 36(c)

[73] Akinyi Florence Ogutu, *Assessment of the Effectiveness of the Policy Framework in Solid Waste Management in Nairobi City County* (University of Nairobi, 2019) < https://www.scirp.org/(S(ny23rubfvg45z345vbrepxrl))/reference/referencespapers?referenceid=3324768> accessed 11th August 2024.

[74] See <http://erepository.uonbi.ac.ke/bitstream/handle/11295/99388/Kariuki_Global%20Strategy%20Implementation%20Challenges%20of%20Kenya%E2%80%99s%20Multilateral%20Environmental%20Agreements%20With%20the%20United%20Nations%20Environment%20Programme%20in%20Nairobi%> accessed 11th August 2024.

[75] Ex parte Sound Equipment Ltd. v. Republic.

[76] Kwanza Estate Ltd vs Kenya Wildlife Services, Civil case no. 133 of 2012

Furthermore, it enables decision-makers to create mitigation strategies significant for reducing or completely preventing the foreseen harm. Therefore, NEMA should ensure that the procedure for the same is duly followed.

Such unprocedural issuance of EIA license by NEMA was witnessed in the case of *Amu Power Company Ltd.*[77] In this matter, the first respondent was a society-based organization that supported Lamu's welfare and interests, and whose membership included both community members and few local civic organizations. To challenge the issuance of the EIA License as well as the procedure of acquiring it, they filed a lawsuit on November 7, 2016. In addressing the issues, court found that the issuance of the EIA license was surrounded by several issues, including: insufficient public involvement, thermoelectric wastewater discharge into the aquatic environments because of subpar and outdated cooling systems, the existence of misstatements and exclusions in the EIA report, and the study's inability to reveal mitigation strategies for the pollution caused by coal handling and storage.[78] The appellants also wanted the decision by NEMA granting the 2nd respondent the EIA license to be set aside.[79] Moreover, NEMA had given conditions to the 2nd respondent on the EIA license, but then NEMA proceeded and issued a license without considering the recommendations it had given earlier. Consequently, the court found that these conditions were inadequate, showing a casual approach of the same by NEMA. Therefore, the court allowed the appeal, citing the case of *Mohamed Ali Baadi,*[80] which delved on section 129(1)(a) of EMCA and established that inadequate meaningful public participation would invalidate the EIA process. Relying on this case, the court found that the respondent's EIA study was invalid due to lack of meaningful public participation.[81] The tribunal further ordered NEMA to adhere to Regulations 17 and 22, to effectively interact with lead agencies and the

[77] Jamal Ahmed Ali & 5 others vs NEMA & Another, Tribunal Appeal no.NET 196 of 2016
[78] Ibid
[79] Ibid
[80] Mohamed Ali Baadi and others vs the Hon. Attorney General and 7 others (HCCC Petition NO 22 OF 2012)
[81] Jamal Ahmed Ali & 5 others vs NEMA & Another, Tribunal Appeal no.NET 196 of 2016

community, and to adhere to the stringent timelines stipulated by the Law.[82]

Lenient penalties

This section appreciates the existence of penalties for environmental pollution, including the pollution of water resources.[83] These penalties include compensation of the victim of pollution and cost of restoration,[84] which do not adequately cater for the damage caused to the environment. On the same note, courts are often barred from exercising their discretion in determining the penalties to be imposed, which results from legislative provisions which prescribe maximum penalties which do not align with the offences. For instance, the provision that the penalty for a person who commits an offence under the Water Act should not be more than Kshs. 1 million and if it's a prison term not to exceed two years,[85] rob judges of their discretion. Therefore, they force the court to have some leniency in giving penalties for the numerous offenses concerning the surroundings, created under EMCA and the Water Act of 2016. This leniency creates some laxity among project proponents in implementing the requirements of the law.

Outdated wastewater management systems in Mavoko

Use of outdated waste water management technologies/systems is among the prime factors leading to natural destabilization. This is because the industries in Mavoko lack the modern pre-treatment mechanisms to treat effluents before discharging them into the environment, thus, causing environmental degradation.[86] The treatment facility at the Export Processing Zone (EPZ) is also insufficient in reducing phosphates, nitrates and heavy metals during the rainy season, thus qualifying it to be categorized as an outdated mechanism for effluent

[82] Ibid
[83] Water Act no.43 of 2016, section 143(1)(b)
[84]EMCA, part (ix) sections 108-116
[85]Water Act no.43 of 2016, section 147
[86]Juma Lillian Adhiambo, 'WasteWater Management: A case of reducing wastewater release into environment in Mathare North, Nairobi County' (2014) p.21

treatment.[87]

Poor Town Planning

The research has discovered that, historically, Mavoko suffers from poor town planning. Consequently, industries are located next to residential neighborhoods which expose the residents to environmental concerns including carbon emissions, dust, and insecticides. For instance, the flower fields along the Mombasa highway are close to rapidly developing residential neighborhoods, which expose residents to the insecticides and other contaminants utilized in the farms.[88]

Recommendations

Industrial wastewater policy

Kenya needs to put in place a separate wastewater policy that will integrate all the scattered regulations. This will help in dealing with the perceived complexity of the regulatory framework. Therefore, this article calls upon the relevant stakeholders including NEMA, WRA, and industrial players to work towards the initiation of this policy.

Sensitization to staff members

NEMA and other enforcement agencies could do well in continual sensitization of its officers against laxity and corruption as the same encourages complacency by industries and project proponents. NEMA should also acquire updated methods of monitoring to check compliance as well as maintaining a database of industries operating within a given area. These records should be updated and submitted within the set timelines to enable the assessing and addressing of

[87]Nadir, Stanley, Mwakio Tole, Najma Dharani, and Godfrey Wafula. *Effectiveness of a Wastewater Treatment Plant located at EPZ in reducing Pollutants Discharged into River Athi, Kenya* (2020). p.262

[88]Un-Habitat, '*Mavoko Urban Sector Profile'* (2006) p.8< https://dokumen.tips/documents/kenya-mavoko-urban-profile.html?page=2.>accessed 8th August 2024.

pertinent issues.

Encouraging proper coordination between NEMA and WRA

Both EMCA and the Water Act provide for licenses to be acquired by project proponents or industries. There should be a system in place for ensuring one license is acquired instead but with the approval of both NEMA and WRA to ensure efficiency of the processes. In such an instance, the agencies collaborate and coordinate on the functions. This invokes the imperative of a multi-agency taskforce which can come up with ideas on the way forward to streamline the process.

Encouraging industrial symbiosis in Mavoko

There is a possibility for industries in Mavoko to implement industrial symbiosism by using the waste produced by other industries or by-product exchange. For instance, sewerage waste is directed to the Pilot Fertilizer Plant or Sanergy Ltd located at Kinanie.[89] The Sanergy ltd recycles sanitary and organic waste to produce insect-based protein and organic fertilizer that's made by thermophilic. The average volume of natural refuse processed daily amount to 30 tonnes.[90] Some industrial manufacturing systems recycle or reuse the waste produced within the system while others leave it. Companies with ecological systems that constantly allow reuse of energy and waste in closed loops by other processes within the system are those with evolved industrial ecosystems and integrated industrial systems.[91] Worth noting is that industrial symbiosis in Mavoko can be limited by insufficient effluent and by-product recovery facilities

[89] Dr. Ayub Macharia, *'Give me organic waste and I will turn it to gold'* (2022) p.1<https://www.mazingirasafi.com/circular-economy-for-organic-waste-in-nairobi/ >accessed 9th August 2024.

[90] Ibid page 2

[91] Kelvin Khisa, '*Development of an industrial ecology model for the Athi River special economic zone: Policy implications for green growth in Kenya'* (2016>p.1

and lack of awareness among stakeholders. [92]

Assessment of town planning

Revising the urban planning for Mavoko would help in removing the industries located close to residential area. This can further be achieved through strict implementation of the zoning guidelines. This should also include outlining the infrastructure, prior to project approval, including waste collection centres, assortment centres, segregation(s), recycling and treatment among others. Lastly, this would involve the implementation of the requirements set for in the Urban and Cities Act,[93] which aspires to put Article 184 of the Constitution into practice, to administer urban regions and towns, to establish the concept of administration and resident engagement,[94] which are integral to environmental governance.

Incorporating technologies into wastewater management systems

Technologies for industrial effluent management, such as modern methods of waste water treatment, would assist in keeping up with the rising population and the high rate of development in Mavoko. Alternatively, the use of industrial parks which incorporate the use of plasma gasification and the use of Abi-Methane, sewerage digester which separates liquid and solid and then treat the liquid while converting the solid into compost.[95] This would greatly lead to resource conservation, waste recycling and reduction engendering the green economy concept.

Conclusion

The right to a clean and healthy environment is fundamental to a country's

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[92] Khisa, K., Oguge, N., & Obiero, S. A. (2018). *Mainstreaming the culture of eco-industrial parks (EIPs) in Kenya for the sustainable realization of the country's vision 2030*: *Journal of International Business Research and Marketing*, *3*(6), pp. 11-12

[93] (2011)

[94] See a<https://www.devolutionhub.or.ke/resource/urban-areas-and-cities-act-2011> accessed 17th August 2024.

[95] Desire Greenberg, '*The greening of industrial property developments in South Africa*' (July 2014) p.9

economic development.[96] Effective management of industrial waste water is crucial to upholding this right.[97] Kenya is fortunate to have a strong framework for industrial wastewater management, but its effectiveness is undermined by complex legal texts, slack implementation, lack of technological knowledge, and institutional shortcomings.

To address these challenges and prioritize a clean environment, this article advocates for a multi-faceted approach. Stakeholders should be educated on industrial wastewater management practices, and a comprehensive legislation should be developed to consolidate existing regulations into a unified framework. Additionally, introducing stricter penalties and improving institutional coordination are essential steps. These measures will significantly enhance Kenya's efforts toward sustainable environmental management and economic growth.

[96] Lucas Schmidt, *True progress for industrialization in Kenya,* (2020) para1< https://borgenproject.orgigf/industrialization-in-kenya/ >accessed 15th July 2024.
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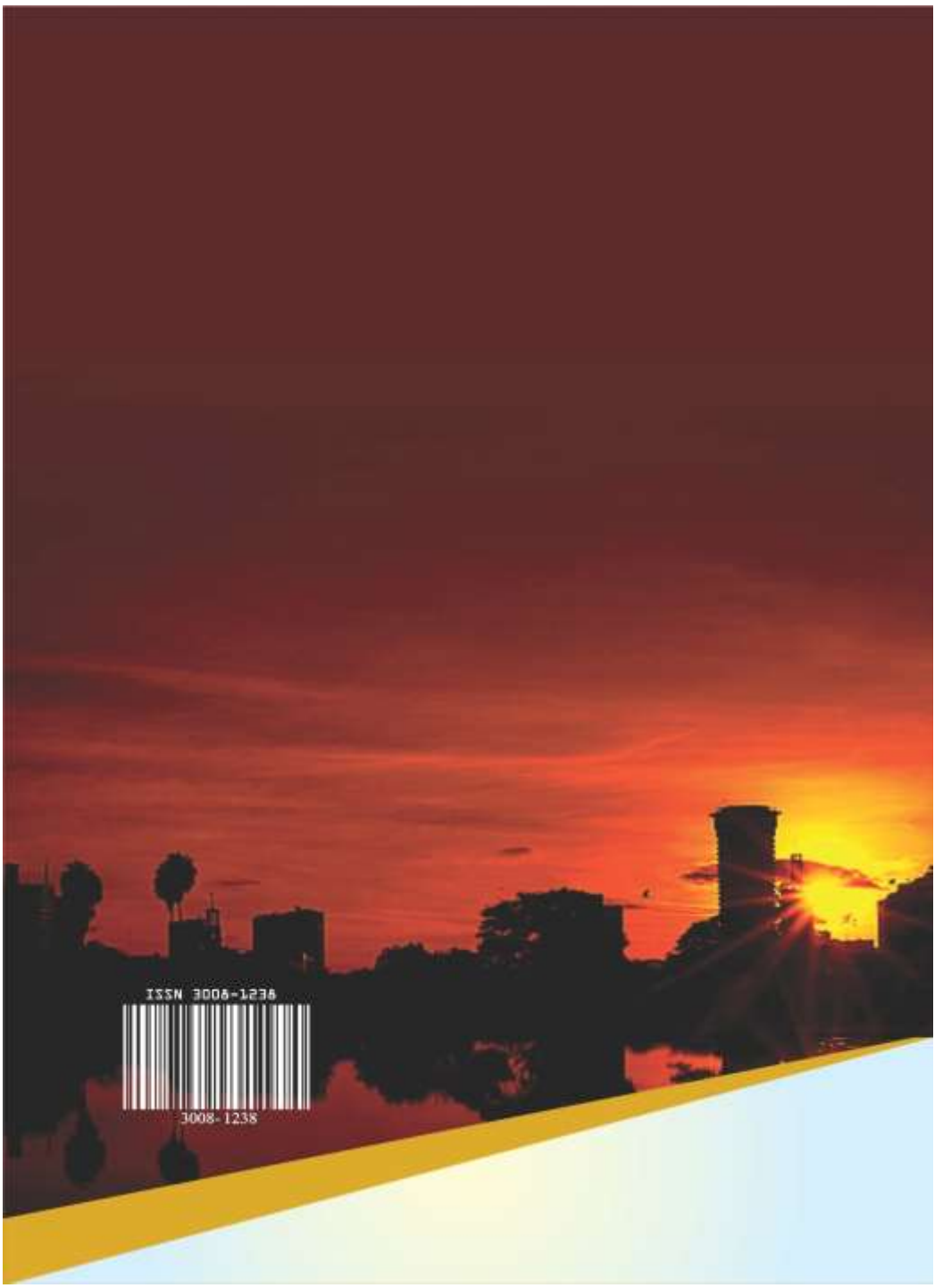
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